

Chernobyl, childhood cancer, and chromosome 21

Probably nothing to worry about

In 1986 the accident at the nuclear reactor in Chernobyl in the former Soviet Union released large amounts of radioactivity into the atmosphere. Adjacent areas were heavily contaminated, while more distant regions were affected less. International committees concluded that valuable information on the effects of radiation might result from long term follow up of workers affected by the accident, many of whom received doses in the range of 250-1000 mSv. The committees also recommended that studies should be carried out of residents living within a 30 km radius of the reactor and of residents of substantially contaminated regions in Belarus, the Ukraine, and Russia, who may have received doses of 50-60 mSv. The scientific value of investigations in Europe and other parts of the former Soviet Union was questioned, however, because estimated exposures (<1 mSv) were believed to have been too low to cause a detectable excess of cases of cancer or genetic defects.¹ For comparison, annual doses from natural background radiation are 1-2 mSv.²

Nevertheless, because of widespread concern among populations in Europe living in areas of low fallout, the International Agency for Research on Cancer organised the European childhood leukaemia-lymphoma incidence study using population based cancer registries in 20

The special difficulties in evaluating, ecological findings are further exemplified in a recent survey in Norway in which the risk of Down's syndrome fell with increasing levels of estimated radiation from Chernobyl.¹³ Because misclassification of exposure and inadequate control of important cofactors can lead to spurious associations, both positive and negative, ecological analyses must be interpreted with great caution.

The importance of studies of human populations exposed to radiation from Chernobyl is not to prove that radiation causes cancer: this has been accepted for more than 50 years, and risks are remarkably well quantified.² Rather, the studies with individual dose characterisations might provide new information on the effects of exposure

accumulated over several months to years, as compared with the instantaneous exposure received by the survivors of the atomic bombs in Japan. Studies of thyroid cancer in children exposed to iodine-131 might also contribute new knowledge. Cohort and case-control studies of workers and of populations living near Chernobyl remain the most promising way of obtaining quantitative information on the health risks from the accident.

JOHN BOICE
Branch chief
MARTHA LINET
Senior investigator

Epidemiology and Biostatistics Program,
National Cancer Institute,
Bethesda, MD 20892, USA

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